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February 20, 2003

OSWER Docket
Environmental Protection Agency
Mailcode: 5305-G
1200 Pennsylvania Avenue, NW
Washington, D.C., 20460
Attn: Docket No. RCRA 2002-0033

Re: Comments on the Draft Subsurface Vapor Intrusion Guidance, Federal Register Notice: November 29, 2002

Dear Sir:

The Site Remediation Program (SRP) of the New Jersey Department of Environmental Protection (NJDEP) is pleased to respond to the Environmental Protection Agency's (EPA) November 29, 2002 Federal Register notice requesting comments on the Draft EPA Subsurface Vapor Intrusion Guidance document. The SRP commends EPA on their comprehensive and timely effort in the evaluation of this complex pathway.

In response to increasing technical questions related to indoor air impacts at sites under review, the NJDEP formed an Indoor Air Committee in November 2000 responsible for addressing the evaluation of the indoor air pathway. Representatives of NJDEP's Indoor Air Committee offer the following comments on the draft guidance. The comments below are presented by section and/or page number for your consideration.

I. INTRODUCTION
D- Item 1, page 3

The guidance document is vague and confusing when it comes to its application to non-residential/occupational settings. As an example, EPA states that, in general, the guidance is not expected to be used in occupational settings but that the States should notify a facility of potential exposure/future risk when employees may be unaware of those chemicals associated with subsurface contamination. It therefore seems that the guidance does apply to non-

residential/occupational settings if only to alert the States and thereby the facilities when further evaluation of potential exposure and future use may be required.

At the EPA Seminar in Dallas, Ray Cody reported that OSHA regulations would apply at all non-residential properties where there is an employer-employee relationship. This is an incredibly broad definition and severely limits the application of the Subsurface Vapor Intrusion Guidance. The document needs to clarify further those occupational scenarios where the EPA guidance for the vapor intrusion pathway is applicable (as explained in Ray's talk).

USE OF THIS GUIDANCE
B- page 9

The document indicates that the target media specific concentrations may be used for those contaminants for which a determination has been made that the pathway is complete. This statement is confusing since the document appears to indicate that the values are used to determine whether the pathway is complete and of potential concern.

IV. TIER 1-PRIMARY SCREENING
Q1, page 15

The document defines volatile organic compounds (VOC) as chemicals with a Henry's law constant greater than $1X\ 10^{-5}$ $atm.m^3/mol$. This is two or more orders of magnitude lower than the Henry's law constants for typical VOCs. This would classify DDE, anthracene, methoxychlor, pyrene and other nonvolatile chemicals as VOC. These chemicals are tightly bound to soil and will exhibit little volatility. It is recommended that EPA consider a vapor pressure definition greater than 1 mm Hg that would still include highly soluble VOC, such as acetone, but eliminate many chemicals adsorbed to soil that do not present an indoor air risk

V. TIER 2-SECONDARY SCREENING
Generic Soil Gas Sampling Verses Sub-Slab Soil Gas Sampling

The guidance document discusses the role of soil gas sampling in determining whether the vapor intrusion pathway is complete. However, there are numerous methods for obtaining soil gas samples with varying degrees of reliability and reproducibility. Tier 2 tends to refer to "soil gas" results (in a generic sense), whereas Tier 3 specifically mentions sub-slab sampling repeatedly. If this differentiation is intentional, the guidance document should clarify the distinction as it relates to the reliability of the data and its applicability for each tier/question.

Subsurface Source Identification: Q4(c) page 23

The guidance indicates that if there is any contaminant source in the unsaturated zone, soil gas samples are needed. The document should clarify the definition of a "soil source."

Question 4(c) asks whether any potential contamination (source of vapors) is found in the unsaturated zone soil above the water table. If a soil contaminant source is present, the investigator is directed to Soil Gas Assessment - Question 4(g). This step bypasses the

Groundwater Assessment. Even though the flow diagram in Appendix C **recommends** checking the groundwater data, there is no requirement. Due to the unreliability of most soil gas sampling methods, the potential for false negatives (negligible soil gas data despite significant GW contamination) is quite real.

Based on the above, it is recommended that after the Yes response to Question Q4(c) the evaluator should not skip to Q4(g) but instead "continue with a Groundwater Assessment performed in conjunction with a soil gas assessment using the ground water target concentrations only if appropriate as indicated above." It is also suggested that EPA modify the flow diagram to indicate a **solid** line from the "Yes" to the box that says "Recommended Check GW data" and change the wording to “Check GW” data.

Q4 (f), page 24

The guidance presents factors that in EPA’s judgment make the use of generic groundwater attenuation factors (and the resulting screening levels) inappropriate. These factors include a water table within 5 feet of a foundation and a water table within 15 feet of a foundation with sumps, unlined crawlspaces, earthen floors, buildings with low air exchange rates and/or significant preferential pathways.

The above factors would exclude use of the generic ground water numbers at probably over 50% of the developed areas of New Jersey. Where only contaminated groundwater is the likely source, slightly less conservative factors may be appropriate especially in situations where ground water contaminant concentrations under foundations are known with relative certainty and where contaminants are likely to be subject to relatively rapid biodegradation. We suggest further refinement of these factors based on the above points and on whether seasonal high water table levels could differ significantly from currently known conditions.

It is also unclear how one can predict the above factors (such as sumps, building airflow, and preferential pathways) when the issue of future use/site development is considered. Based on EPA’s statement, the uncertainty around future use in relation to the above factors brings into question whether any definitive use of the generic values to evaluate groundwater and soil gas concentrations is appropriate. If EPA feels the above factors limit use of the generic values, the document should provide guidance on how the issue of future use should be addressed within the Tier 2 Screening section of the document.

Soil Gas Assessment
Q4(h) page 25,

The document does not clarify when a soil source is “adequately characterized.”

Tables, Item 3. page 28.

EPA should clarify how frequently they will update the tables based on new toxicity data (i.e., every 6 months) and where the updated tables will be presented (i.e., Superfund web site).

The document indicates that if the health based groundwater concentration protective of indoor air is below the chemical's MCL, the MCL is recommended as the target concentration. There is some concern that the MCL may not be protective of indoor air impacts since the MCL is based on drinking water and does not take into consideration the vapor intrusion pathway. It is NJDEP's understanding that EPA hopes to look further into this issue in conjunction with the development and evaluation of the vapor intrusion case database. In the interim, it is recommended that the health based value be included in the table as a footnote or in parentheses along with the MCL value. State standards/criteria, such as New Jersey's Ground water Quality Standards, would be applicable and may differ from the cited MCLs.

Usable Data, Item 4, Page 28,

The guidance document does not specify what constitutes a short interval for a well screen. Would it be 10 feet, 5 feet or something else? The sentence containing "(preferably over short intervals)," could be modified to state that "…groundwater samples be taken from wells screened across the top of the water table, preferably with screen lengths of about 10 ft or less."

Subsurface Source Identification: Q5 (d), page 32

As previously noted for Q4(c), Q5 (d) asks whether any potential contamination (source of vapors) is found in the unsaturated zone soil above the water table. If a soil contaminant source is present, the investigator is directed to Soil Gas Assessment - Question 5(f). This step bypasses the Groundwater Assessment. Even though the flow diagram in Appendix C **recommends** checking the groundwater data, there is no requirement. Due to the unreliability of most soil gas sampling methods, the potential for false negatives (negligible soil gas data despite significant GW contamination) is quite real.

As stated above for Q4 (c), it is recommended that after the Yes response to Question Q5 (d) the evaluator should not skip to Q5 (f) but instead "continue with a Groundwater Assessment performed in conjunction with a soil gas assessment using the ground water target concentrations only if appropriate as indicated above." It is also suggested that EPA modify the flow diagram to indicate a **solid** line from the "Yes" to the box that says "Recommended Check GW data" and change the wording to "Check GW" data.

Table 4, Guidance for the selection of the soil type. Page 35

The basis of the table on the selection of soil types should be explained.

IV. TIER 3 - SITE-SPECIFIC ASSESSMENT
Page 38

The guidance document recommends for Tier 3 (in the 1st paragraph) the collection of sub-slab soil gas and indoor air samples, as well as *complementary site-specific mathematical modeling, if appropriate.* This would suggest that sub-slab soil gas and/or indoor air sampling is required for this step and modeling may be employed as a corresponding step. Yet, Question 6(c) allows the investigator to conclude the pathway is incomplete using the mathematical model and without

collecting any analytical samples. This is contrary to the summary at the beginning of the Tier 3 discussion and is contradictory to the concept of a site-specific assessment. In fact, discussion point #6 (page 44) states that modeling *is intended to complement the evaluation of samples collected.*

It seems that after 2 tiered steps consisting of a series of 18 questions using peripheral screening data, that the final set of questions would involve the collection of actual analytical data from the point of exposure - within the structure.

It is recommended that sub-slab soil gas and/or indoor air samples be required as part of the Tier 3 approach. The checklist (questions) need to be revised to reflect the discussion points in the guidance document. If the investigator simply uses the checklist, the assessment will be invalid.

Q6 (g), page 41

The guidance recommends that the analysis of indoor air samples be limited to constituents of potential concern found on the site. The NJDEP recommends that this provision be removed from the document.

The assessment of vapor intrusion and indoor air results must take into account the appropriate application of Federal and State policies relating to the role of background. USEPA policy recommends that contaminant concentrations attributable to background sources not be eliminated from the risk assessment process (OSWER 9285.6-7P, dated 26 April 2002). This allows for the total risk to be properly assessed, even though the remedial action ultimately may not address the background sources. Some states, including Massachusetts and Connecticut, have factored chemical-specific background values into their indoor air screening criteria.

Furthermore, the utilization of TO-15 will generate data for the entire fraction of volatile organic compounds (as defined in the method), not just a select number of compounds. Therefore, it would be inappropriate to hold back information from occupants that may relate to their future health, even if the contamination is unrelated to the site under investigation.

Q6 (h), page 41

Given that the guidance stresses the importance of determining seasonal variation in indoor air data, what data exists at this time, and how much variation has been observed?

APPENDIX A
Table A-2

Table A-2 lists an average practical detection limit of 0.2 to 0.5 ug/m3 for air analytical Methods QAR TO-15 and 17. Section IV of Appendix E cites an MDL value of 0.5 ppbv for Method TO-17. The detection limits in Table 2 should be clarified. It is also unclear how EPA proposes to address health base indoor air values that are lower than the method analytical PQL. During indoor air sampling would the method analytical PQL be used as the target air concentration when higher than the health based value?

APPENDIX D
Section 5, page D-4

The equations and resulting calculations used to generate the acceptable indoor air levels are different than the equations/calculations used by Region III and Region VI. Region III and Region VI use a combined childhood and adult exposure for carcinogens that is not included in the guidance. The guidance also uses the reference concentration (modified by the target hazard quotient) as the non-cancer indoor air level. Is there any effort currently underway in EPA to reconcile the different methodologies and generate one approach applicable to all the regions? It would seem that this document further demonstrates the need to reconcile any differences in the development of acceptable indoor air values.

The document states that an indoor air screening level is based on an non-extrapolated toxicity value when both extrapolated and non-extrapolated values are available. A footnote should be included in the media screening tables indicating when an extrapolated value is not used. This practice is also different than the procedure used by Region III where extrapolated values are the basis of some indoor air values (i.e. chloroethane and 1,2 dichloropropane). The guidance's choosing not to use some provisional NCEA toxicity/risk factors also is inconsistent with some of the regions that do use provisional values (i.e. 1,4 dichlorobenzene). It is again suggested that this is an issue that should be reconciled.

APPENDIX E

The importance of the soil moisture level on measured and modeled results is discussed earlier in the document, and a method is given on page E-1 for its determination. However, the determination of this parameter is difficult, both because of sampling issues, and because of its daily and seasonal variability. In fact, EPA's Soil Screening Guidance recommends against the use of this parameter because of the uncertainty involved, and recommends estimation methods. The guidance concerning this parameter should be reconsidered

Further explanation of what constitutes "reasonable estimates" of ground water quality should be provided in this section.

Based on information presented in the training sessions, EPA should add more details, or case study examples, of how inappropriate sampling methods and well construction may cause inadequate evaluation of the pathway.

A statement could be added to indicate that private water supply well sampling results can be used as an indicator that further investigation of the pathway is appropriate but direct comparison of this data to the ground water target criteria in Table 2 is not appropriate

Some mention should be made on page E-8 regarding EnCore sampling, since this technique is designed for VOC determination in soils. Does EPA find the use of this method acceptable in the evaluation of the pathway?

APPENDIX F

The guidance should be clarified as to whether the alpha factor shown on pages F-1 and F-2 is identical to the alpha value shown on the "INTERCALCS" page of the J&E spreadsheet. Specifically, does the J&E Spreadsheet alpha value include the Henry's law constant factor?

The table on page F-6 is of questionable value and needs further discussion. Without these values being indicated as means or medians and without any indication of the variability of these values, they are of limited use. For example, the 1,1,1-trichloroethane value of 271.4 by Shah and Singh is certainly not typical and useless without context. Furthermore, several major studies (RIOPA, NHEXAS, EXPOLIS, and TEAM) were primarily designed to measure personal exposure, but typically included ambient indoor measurements (e.g. overnight bedside values). These studies all provide large databases that should be considered. Dr. Paul Sanders, of the Indoor Air Committee, has prepared several summary tables of this information that are available upon request.

The figure on page F-7 cites "above typical background values". The typical background values should be clarified and cited.

It should be pointed out that it is statistically invalid to use the same database to test the reliability of the attenuation factors as was used to develop the factors. A separate set of data must be used.

Detail on the sampling method and depth of the ground water samples in the database should be clarified in Section 1, 2 or 3. Since the guidance recommends using ground water data from samples of the uppermost portion of the saturated zone it seems appropriate to indicate how well the data used to develop the attenuation factors meets that criteria.

APPENDIX G

It appears that 25°C was used in the J&E model simulations (page D-3). If not, no other temperature is mentioned in this guidance. Since soil and groundwater temperatures are closer to 10°C, shouldn't lower temperatures be used, especially since the Henry's law constant is sensitive to temperature?

APPENDIX I

The discussion on background contamination from indoor VOC sources needs to be greatly expanded. This is an integral part of any indoor air sampling event and should not be minimized. The specific sources of indoor air contamination and the numerous methods to address background sources should be evaluated in detail.

In addition, the *Occupied Dwelling Questionnaire* in Appendix H is designed to identify potential background sources and is one of the primary methods of addressing these non-site related sources. The questionnaire should be moved to Appendix I.

The SRP appreciates the opportunity to provide assistance to EPA on this important topic. If additional information is required, I may be reached at (609) 984-9872

Sincerely,

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